

CLAIMS

1. A dual-opening sample container, comprising:

a body, said body being formed of substantially rigid, fluid impermeable material and having a hollow cavity in communication with first and second open ends;

first and second end seals, said end seals being sized and shaped to fit sealably said first and second open ends;

a first elastic member, said first elastic member urging said first and second end seals to removably close said first and second open ends.

2. The dual-opening sample container, as described in Claim 1, further comprising first and second activating protrusions, each of said activating protrusions extending outwardly from outer ends of said first and second end seals and being sized, shaped, and disposed to removably engage means for holding open said end seals.

3. The dual-opening sample container, as described in Claim 2, wherein said activating protrusion further comprises any of holes, loops and hooks for removable engagement of said means for holding open said end seals.

4. The dual-opening sample container, as described in Claim 1, wherein said first and second end seals further comprise any of holes, loops and hooks for attachment to said first elastic member.

5. The dual-opening sample container, as described in Claim 1, wherein said first elastic member is disposed within said hollow cavity.

6. The dual-opening sample container, as described in Claim 1, wherein said first elastic member is disposed outside of said sample container.

7. The dual-opening sample container, as described in Claim 1, further comprising first and second securing caps, said securing caps being sized and shaped to retain said first and second end seals in sealable connection with said first and second open ends of said sample container.

8. The dual-opening sample container, as described in Claim 7, wherein said first and second open ends of said sample container have an external thread and said first and second securing caps have a mating, internal thread.

9. The dual-opening sample container, as described in Claim 7, wherein said first and second open ends of said sample container have an external bayonet mount and said first and second securing caps have a mating, internal bayonet mount.

10. The dual-opening sample container, as described in Claim 7, wherein at least one of said first and second securing caps further comprises a septa permitting introduction of a syringe needle and subsequent resealing of said securing cap.

11. The dual-opening sample container, as described in Claim 1, wherein said first and second end seals comprise a substantially rigid core, said core being surrounded by a resilient material.
- 5 12. The dual-opening sample container, as described in Claim 11, wherein said substantially rigid core and said resilient material are coated with substantially chemically inert material.
13. The dual-opening sample container, as described in Claim 12, wherein said
10 substantially chemically inert material is selected from the group comprising:
tetrafluoroethene, polytetrafluoroethene, perfluoralkoxy and
fluoroethylpropylene.
14. The dual-opening sample container, as described in Claim 1, wherein said first and
15 second end seals further comprise a compressible seal, said seal permitting an
elevation of fluid pressure within said sample container upon compression of said seal.
15. The dual-opening sample container, as described in Claim 1, wherein at least one of
said first and second end seals further comprises a resilient material, said resilient
20 material permitting an elevation of fluid pressure within said sample container upon
compression of said seal.

16. The dual-opening sample container, as described in Claim 1, wherein said first and second end seals have a first side, said first side being substantially conical and being sized and shaped to fit sealably into said first and second open ends of said sample container.

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17. The dual-opening sample container, as described in Claim 7, wherein said first and second end seals have a second side, said second side having a substantially flat surface to mate with a flat inner side of either of said first and second securing caps.

10 18. The dual-opening sample container, as described in Claim 1, wherein at least one of said first and second end seals have a membrane central portion, said central portion permitting introduction of a syringe needle through said end seals.

15 19. The dual-opening sample container, as described in Claim 1, wherein said sample container is formed from material selected from the group comprising:
glass, steel and plastic.

20. The dual-opening sample container, as described in Claim 1, wherein an outside diameter of said sample container ranges from 8 mm to 60 mm.

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21. The dual-opening sample container, as described in Claim 1, wherein an overall length of said sample container ranges from 20 mm to 150 mm.

22. The dual-opening sample container, as described in Claim 1, wherein said sample container has a capacity ranging from 2 ml to 2400 ml.

23. A fluid sampling device with dual-opening sample containers, comprising:

- 5 at least one sample container, said container being formed of substantially rigid, fluid impermeable material and having a hollow cavity in communication with first and second open ends;
- first and second end seals, said end seals being sized and shaped to fit sealably said first and second open ends;
- 10 a first elastic member, said first elastic member urging said first and second end seals to removably close said first and second open ends;
- a support platform, said support platform being removably attached to said sample container and having a fixture for removable connection to a raising and lowering device;
- 15 said support platform having first and second movable attachment members, said attachment members being sized, shaped and disposed to removably engage said first and second end seals;
- a trigger, said trigger disposed to move said attachment members from a first position to a second position; and
- 20 whereby, when said sample container is attached to said support platform and said first and second end seals are engaged by said first and second attachment members in said first position, said sample container will be open, whereupon it may be lowered into a fluid source by said raising

and lowering device and said trigger pulled to move said first and second attachment members to said second position releasing said first and second end seals, permitting said first elastic member to urge said first and second end seals to seal said first and second open ends of said sample container, thereby causing a fluid sample to be sealed within said sample container, said support platform may then be withdrawn from said fluid source with said sealed sample container and said fluid sample.

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10 24. The fluid sampling device with dual-opening sample containers, as described in Claim 23, further comprising a trigger sheath, said sheath being sized and shaped to fit slidably over said trigger and being attached at a first end to said support platform and extending upwardly about said trigger.

15 25. The fluid sampling device with dual-opening sample containers, as described in Claim 23, further comprising a second elastic member, said second elastic member urging said attachment members to said first position.

20 26. The fluid sampling device with dual-opening sample containers, as described in Claim 23, further comprising first and second activating protrusions, each of said activating protrusions extending outwardly from outer ends of said first and second end seals and being sized, shaped, and disposed to removably engage said movable attachment members.

27. The fluid sampling device with dual-opening sample containers, as described in Claim 26, wherein said activating protrusion further comprises any of holes, loops and hooks for removable engagement of said movable attachment member.

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28. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said first and second end seals further comprise any of holes, loops and hooks for attachment to said first elastic member.

- 10 29. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said first elastic member is disposed within said hollow cavity.

30. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said first elastic member is disposed outside of said sample container.

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31. The fluid sampling device with dual-opening sample containers, as described in Claim 23, further comprising first and second securing caps, said securing caps being sized and shaped to retain said first and second end seals in sealable connection with said first and second open ends of said sampling container.

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32. The fluid sampling device with dual-opening sample containers, as described in Claim 31, wherein said first and second open ends of said sampling container have an external thread and said first and second securing caps have a mating, internal thread.

33. The fluid sampling device with dual-opening sample containers, as described in Claim 31, wherein said first and second open ends of said sampling container have an external bayonet mount and said first and second securing caps have a mating, internal bayonet mount.

34. The fluid sampling device with dual-opening sample containers, as described in Claim 31, wherein at least one of said first and second securing caps further comprises a septa permitting introduction of a syringe needle and subsequent resealing of said securing cap.

35. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said support platform has a hollow body, said hollow body being sized and shaped to enclose said sample container.

36. The fluid sampling device with dual-opening sample containers, as described in Claim 35, wherein said support platform further comprises at least one fluid-permeable protective end cover, said end cover partially enclosing an open end of said hollow body.

37. The fluid sampling device with dual-opening sample containers, as described in Claim 36, wherein said fixture for removable connection to a raising and lowering device is attached to said end cover.

38. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said sampling container is sized and shaped to substantially enclose said support platform within outer horizontal dimensions of said sample container.

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39. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said first and second end seals comprise a substantially rigid core, said core being surrounded by a resilient material.

10 40. The fluid sampling device with dual-opening sample containers, as described in Claim 39, wherein said substantially rigid core and said resilient material are coated with substantially chemically inert material.

15 41. The fluid sampling device with dual-opening sample containers, as described in Claim 40, wherein said substantially chemically inert material is selected from the group comprising:

tetrafluoroethene, polytetrafluoroethene, perfluoralkoxy and
fluoroethylpropylene.

20 42. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said first and second end seals further comprise a compressible seal, said seal permitting an elevation of fluid pressure within said sample container upon compression of said seal.

43. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein at least one of said first and second end seals is formed of resilient material, said resilient material permitting an elevation of fluid pressure within said sample container upon compression of said seal.
44. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said first and second end seals have a first side, said first side being substantially conical and being sized and shaped to fit sealably into said first and second open ends of said sample container.
45. The fluid sampling device with dual-opening sample containers, as described in Claim 31, wherein said first and second end seals have a second side, said second side having a substantially flat surface to mate with a flat inner side of either of said first and second securing caps.
46. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein at least one of said first and second end seals have a membrane central portion, said central portion permitting introduction of a syringe needle through said end seals.

47. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said sample container is formed from material selected from the group comprising:

glass, steel and plastic

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48. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein an outside diameter of said sample container ranges from 8 mm to 60 mm.

49. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein an overall length of said sample container ranges from 20 mm to 150 mm.

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50. The fluid sampling device with dual-opening sample containers, as described in Claim 23, wherein said sample container has a capacity ranging from 2 ml to 2400 ml.

- 15 51. A method of sampling fluid using a fluid sampling device with dual-opening sample containers, comprising the steps of:

providing at least one sample container, said container being formed of substantially rigid, fluid impermeable material and having a hollow cavity in communication with first and second open ends;

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providing first and second end seals, said end seals being sized and shaped to fit sealably said first and second open ends;

providing a first elastic member, said first elastic member urging said first and second end seals to removably close said first and second open ends;

providing a support platform, said support platform being removably attached
to said sample container and having a fixture for removable connection
to a raising and lowering device;
said support platform having first and second movable attachment members,
5 said attachment members being sized, shaped and disposed to
removably engage said first and second end seals;
providing a trigger, said trigger disposed to move said attachment members
from a first position to a second position;
attaching said support platform to said sample container with said movable
10 attachment members in said first position, engaging said first and
second end seals to as to maintain said end seals in an open position;
attaching said support platform to said raising and lowering device;
lowering said support platform into a fluid source;
pulling said trigger to move said attachment members from said first position
15 to said second position, thereby sealing said first and second open ends
with a fluid sample inside of said hollow cavity;
raising said support platform from said fluid source;
removing said sealed sample container from said support platform; and
whereby, when said sample container is removed from said support platform, it
20 may be sent for testing and examination without contamination from
elements outside said fluid source.

52. The method of sampling fluid using a fluid sampling device with dual-opening sample containers, as described in Claim 51, further comprising the steps of:

providing first and second securing caps, said securing caps being sized and shaped to retain said first and second end seals in sealable connection with said first and second open ends of said sampling container; and attaching said first and second securing caps to said first and second open ends of said of said sample container.

53. The method of sampling fluid using a fluid sampling device with dual-opening sample containers, as described in Claim 51, further comprising the steps of:

providing at least one of said first and second end seals with a membrane central portion, said central portion permitting introduction of a syringe needle through said end seal;

providing first and second securing caps, said securing caps being sized and shaped to retain said first and second end seals in sealable connection with said first and second open ends of said sampling container;

at least one of said securing caps having a septa permitting introduction of a syringe needle and subsequent resealing of said securing cap;

inserting a syringe needle through said septa and said membrane central portion;

withdrawing a fluid sample from said sample container;

removing said syringe needle from said septa and said membrane central portion; and

depositing said fluid sample in a test facility.